Alaska Department of Fish and Game
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Impacts of Heavy Hunting Pressure on the Density and Demographics of Brown Bear Populations in Southcentral Alaska

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Research Performance Report
1 July 2000–30 June 2001
Federal Aid in Wildlife Restoration
Grant W-27-4, Study 4.26

This is a progress report on continuing research. Information may be refined at a later date.

ALASKA DEPARTMENT OF FISH AND GAME
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PROJECT TITLE: Impacts of heavy hunting pressure on the density and demographics of brown bear populations in Southcentral Alaska

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COOPERATORS: NONE

GRANT AND SEGMENT NR.: W-27-4
PROJECT NR.: 4.26
SEGMENT PERIOD: 1 July 2000–30 June 2001

WORK LOCATION: Unit 13
STATE: Alaska

I. PROGRESS ON PROJECT OBJECTIVES

Objective 1**:** **H1. The brown bear population density in the 13A study area is the same as in the remote Su-hydro area in 13E studied in 1985 and 1995.** A CMR conducted in 1997-1998 showed the density of brown bears in the Nelchina study area (13A) to be similar to that of southeastern 13E. A CMR has not been performed since 1998, as it will take time for the harvest intensity effects to be seen at a population level.

Objective 2: **H2. Density of the brown bear population in the 13A study area is the same in 1998 as during subsequent studies.** The CMR conducted in 1997 – 1998 determined that average densities (# bears/ 1000km^2) for independent bears, bears >2 years old, and all bears were 21.3 (95% CI = 18.3–25.9), 21.3 (18.47–25.6), and 27.49 (25.2–30.7), respectively. Enough time has not elapsed to warrant conducting an additional CMR at this time.

OBJECTIVE 3: **H3. The adult sex ratio and age structure of the brown bear population in the 13A study area is the same as in the remote Su-hydro study area.** In 1997 25 bears were captured during pre-marking for a CMR, and the sex ratio (combined with 1996 capture data) was found to be 50 males/per 100 females. This was similar to data collected earlier in 13E (42.9 males/100 females). No additional work has been conducted.

OBJECTIVE 4: **H4. Productivity of moose populations is independent of changes in bear density.** No work has been done on this objective through this project. Measures of moose population productivity are under investigation by Testa.

OBJECTIVE 5: **H5. Reproductive parameters for bears in the 13A study area are the same in as in the remote Su-hydro (13E) area studied between 1980 and 1995.** Survivorship of radiomarked females in 13A (from 1996–1997) was 0.86, compared to a survivorship of 0.79 found for collared females in 13E. However, data from unit 13E is based upon observations of 298 bears, whereas unit 13A data is based on 14 females. No additional work has been conducted.

OBJECTIVE 6: **H6. Determine nutritional value of moose and caribou (calves and adults) to foraging brown bears.** A total of 33 captures were initiated on 11 bears between July 1, 2000 and June 30, 2001. Adult females were captured in the late summer and fall of 2000, again in the early spring of 2001 just immediately upon den emergence, and one more time again approximately 30 days after peak calving. Upon each capture, body

composition was determined by total body water dilution and BIA, blood and hair samples were collected for stable isotope analyses, and fat biopsies were collected for fatty acid analysis.

II. SUMMARY OF WORK COMPLETED ON JOBS IDENTIFIED IN ANNUAL PLAN

THIS PERIOD JOB 1. Estimate brown bear density in an approximate 700 mi^2 portion of Subunit 13A centered in the area of intensive moose studies (Testa 1994).
No work was done on this job in this time period. This work was accomplished in 1997–1998.

JOB 2. Estimate sex ratio and age structure of the brown bear population in the 13A study area and compare to composition of population in 13E study areas and to composition of harvested bears.
No work was done on this job in this time period. This work was accomplished in 1997–1998.

JOB 3. Estimate changes in bear productivity and survivorship that may occur in response to heavy hunting pressure.
No work was done on this job in this time period.

JOB 4. Document movements and habitat use of radio-marked bears throughout the period of den emergence during 1996, 1997, and 1998.
No work was done on this job in this time period.

JOB 5. Contrast predation rates on neonatal moose calves by radio-marked brown bears with previous results at lower moose densities.
No work was done on this job in this time period.

JOB 6. Evaluate prevalence of consumption of moose and of caribou by bears through analysis of prey specific fatty acids identified in bears.
Lipid biopsies were collected from adult bears when captured for body composition determinations. Laboratory analyses have not been performed yet. The Federal Aid portion of sample collection is estimated to be ($4,000.00).

JOB 7. Determine body composition changes and diet switching by bears. Stable isotopes and electrical impedance analysis will determine the response of bear body composition as the bears feed upon calves and adults. Data collected during the time period of between 1 July 2000 and 30 June 2001 are reported here. Immediately prior to entering the den in fall 2000 the bears had a mean mass of 182.5 kg with mean body fat of 29.8%. Upon den emergence in spring 2001 the average body mass was 119.2kgs, average body fat was 9.3%. After peak calving but before 1 July 2001 the mean body mass of the bears had increased to 138kg, whereas the mean body fat had continued to decline to around 5.5%. The adult female brown bears in GMU 13 gain total body mass after den emergence, however continue to lose body fat until later in the summer or early fall. During the time period of peak calving, when bears kill and eat calves, the bears will continue to lose body lipids.

A total of 8 telemetry flights were flown, which produced 75 relocations/sightings of collared bears. Federal Aid funds paid for the cost of bear captures and sample analyses ($60,000).

JOB 8. Preparation of annual reports and publications.
No peer-reviewed publications have been written yet as data collection is still incomplete. However several public seminars of the data were presented and a poster was composed and drafted. Additional time was spent compiling and analyzing data. Federal aid funds paid for $12,000.

III. ADDITIONAL FEDERAL AID-FUNDED WORK NOT DESCRIBED ABOVE THAT WAS ACCOMPLISHED ON THIS PROJECT DURING THIS SEGMENT PERIOD:

THERE WAS NO ADDITIONAL FEDERAL AID-FUNDED WORK ON THIS PROJECT.

IV. FEDERAL AID TOTAL PROJECT COSTS FOR THIS SEGMENT PERIOD

$149,400

V. PREPARED BY:

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APPROVAL DATE: _____